

Coastal Community Resilience



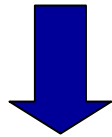
A Working Concept of the US IOTWS Program

*Shaped, planned, disturbed and adapted by a collaboration
of the Program Integrator's CCR team*

Tetra Tech, NOAA and CRC/URI

Coastal Community Resilience Role for IOTWS

- How resilient is the community?
- What are the gaps? needs?
- What strategies, good practices and tools will enhance resilience?



*Concepts, scorecard, guidebook
& partnerships*



Hazard

A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

Hazards can include latent conditions that may represent future threats and can have different origins: natural or induced by human processes

(UN/ISDR. Geneva 2004)

Hazards in the Coastal Zone

Episodic

- tsunami, earthquake, storm surge, flooding, landslides, pollution (spills)

Chronic

- shoreline erosion, sea level rise, climate variability, coastal resource degradation, pollution



Vulnerability

The conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to be impacted by hazards

UN/ISDR. Geneva 2004

Vulnerable Coastal Communities

- *Social/Economic*: Poverty and few livelihood options for coastal communities
- *Environmental*: Declining natural resource base, especially fisheries, threaten food security and livelihoods
- *Governance*: Weak institutions and critical infrastructure to address coastal hazards



resilience

is the flip side of

vulnerability

Resilience of Social-Ecological Systems

Resilience determines the **persistence of relationships** within a system and is a **measure** of the ability of these systems to **absorb change** of state variables, driving variables and parameters, and still persist.

(Holling 1973; Folke *et al.* 2002)

Defining characteristics:

- Amount of disturbance a system can absorb and remain in a given state
- Degree to which the system is capable of self-organization
- Degree to which the system can build capacity for learning and adaptation



Characteristics of Resilient Systems to Create Disaster-Resilient Communities

Redundancy - systems designed with multiple nodes

Diversity - multiple components or nodes versus a central node

Efficiency - positive ratio of energy supplied to energy delivered

Autonomy - capability to operate independent of outside control

Strength - power to resist a hazard force or attack

Interdependence - integrated components support each other

Adaptability - capacity to learn from experience; flexibility to change

Collaboration - multiple opportunities & incentives for participation

(Godschalk 2003)

Resilience and Vulnerability

Loss of resilience results in **vulnerability** of the system to change that could previously be absorbed

Managing for resilience enhances the likelihood of sustaining development in **changing** environments where the future is unpredictable and surprise is likely

Resilience shifts policies from those that **control change** in systems assumed to be stable to **managing the capacity** of systems to cope with, adapt to, and shape change

A Resilient Coastal Community...

Assesses coastal resources and hazards and analyzes social vulnerabilities

Mitigates hazards and reduces vulnerabilities through integrated planning and long-term implementation strategies

Maintains diverse ecological and socio-economic systems to absorb change in an uncertain environment

Facilitates adaptive management by learning from experience and regular review

Promotes broad stakeholder involvement and collaboration to provide redundant and interdependent mechanisms

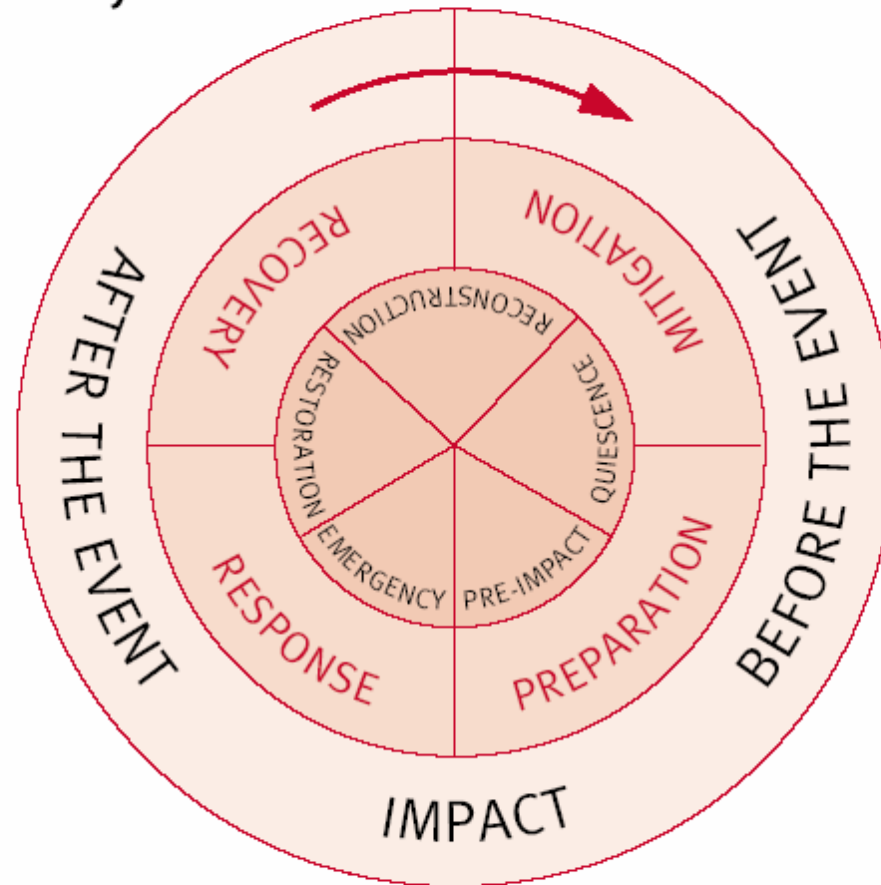
Plans to recover from disaster in advance



Disaster Management Framework

Mitigation	<ul style="list-style-type: none">• Hazard assessment• Risk and vulnerability analysis• Mitigation strategies and vulnerability reduction• Integration of DRR in development activities
Preparedness	<ul style="list-style-type: none">• Warning prediction and dissemination• Emergency preparedness• Education, training, and public awareness
Response	<ul style="list-style-type: none">• Mobilization• Needs assessment• Rescue and evacuation• Emergency assistance
Recovery	<ul style="list-style-type: none">• Rehabilitation• Reconstruction

The disaster cycle



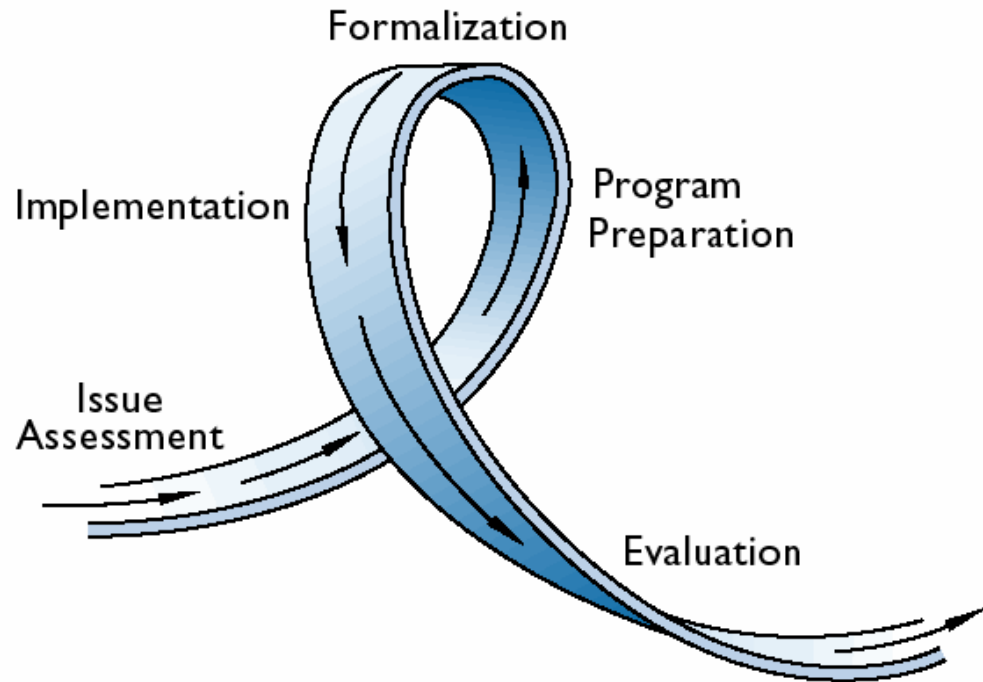
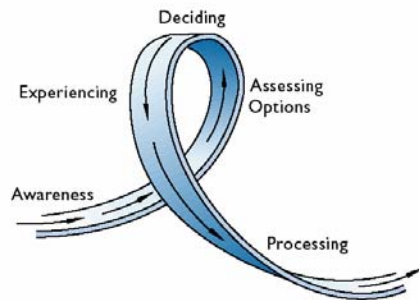
D. Alexander, *Principles of Emergency Planning and Management* (Harpenden: Terra Publishing, 2002), p. 6.

Coastal Management Framework

Assessment & Planning	<ul style="list-style-type: none">• Coastal resource and hazard assessment• Plan formulation and revision
Implementation	<ul style="list-style-type: none">• Shoreline/foreshore management• Marine zoning• Marine protected area management• Coastal vegetation/mangrove management• Upland/watershed management• Environment-friendly enterprise development
Monitoring & Evaluation	<ul style="list-style-type: none">• Annual Progress Review• Biophysical/socioeconomic monitoring
Governance	<ul style="list-style-type: none">• Legal and policy framework• Institutional Capacity• Coastal Law Enforcement
Education & Outreach	<ul style="list-style-type: none">• Public awareness• Formal and informal education

Coastal Management Process

The Learning Cycle



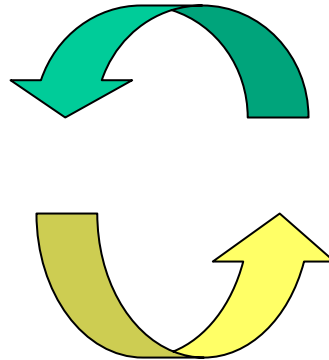
Integrating Frameworks

Disaster Management Framework

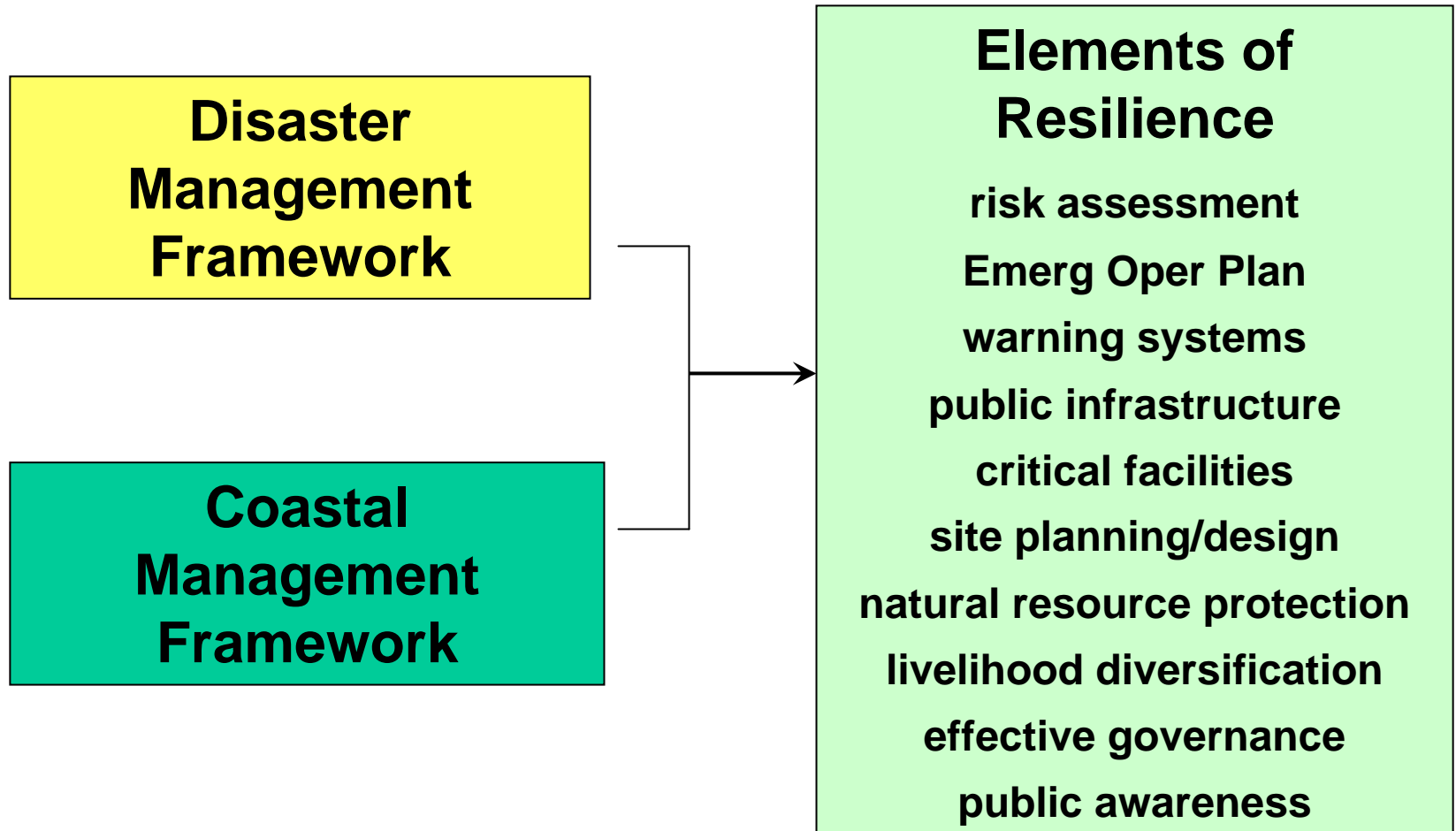
Mitigation
Preparedness
Response
Recovery

Coastal Management Framework

Assessment & Planning
Implementation
Monitoring & Evaluation
Governance
Education & Outreach



Integrating Frameworks



Assessing Resilience (scorecard)

Elements of Resilience

- Risk assessment
- Emergency Operation Plan
- Warning systems
- Public infrastructure
- Critical facilities
- Site planning/design
- Natural resource protection
- Livelihood diversification
- Food security
- Effective governance
- Public awareness



Coastal Community Resilience Guide

1. Introduction

- Coastal Resources and Coastal Hazards
- Coastal Community Resilience: *Elements & Endpoints*

2. Self Assessment Tool

- Coastal Villages, Urban Areas, and Resorts

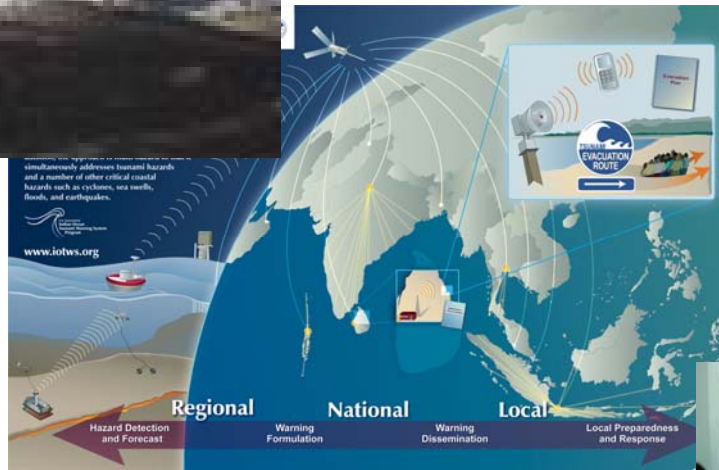
3. CCR Strategies and Good Practices

- *Compilation* of existing tools

4. Implementation

- Outreach, recognition, education, training
- Case Studies

Hazards



Resilient communities

